



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,539	10/01/2003	Takahiko Sakamoto	2003-1400A	5353
513	7590	02/07/2005	EXAMINER	
WENDEROTH, LIND & PONACK, L.L.P.			FARAHANI, DANA	
2033 K STREET N. W.				
SUITE 800			ART UNIT	
WASHINGTON, DC 20006-1021			2829	
			PAPER NUMBER	

DATE MAILED: 02/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/674,539

Applicant(s)

SAKAMOTO ET AL.

Examiner

Dana Farahani

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al., hereinafter Song (US Patent Application Publication 2002/0047128), previously cited, in view of Kato et al., hereinafter Kato (US Patent 6,809,340) a newly cited reference.

Regarding claims 17 and 18, Song discloses in figures 6b-8, a laminated-layer construction of semiconductor having an n-type contact layer 33 of nitride semiconductor with an n-side electrode 38, a p-type contact layer 35 of nitride semiconductor with a p-side electrode 37, and an active layer 34 of nitride semiconductor,

wherein the n-side electrode and the p-side electrode are provided on the same electrode-forming-plane side (in figures 6a, 7 and 8),

wherein the n-type contact layer has a first area where the laminated-layer construction of semiconductor with the p-side electrode is provided (this is the area directly beneath the p-side electrode in figures 6a-8), and a second area (this is the area that is around the n-electrode and also between the n-electrode and the p-electrode in figures 6a-8) which is different from the first area as viewed from the electrode-forming-plane side.

Song does not disclose a plurality of bumps and dips is formed in the second area,

Art Unit: 2814

wherein a top level of the plurality of bumps and dips is positioned on the p-type contact layer side of the active layer in a cross-sectional view of the light-emitting diode, and

wherein the bottom level of the plurality of bumps and dips is positioned on the n-type contact layer side of the active layer in the cross-sectional view of the light-emitting diode.

Kato discloses in figure 6, a light emitting device has bumps and dips in the active layers and also layer 103, as shown as region 109 in the figure. Kato also discloses the bumps and dips of the layers increase the efficiency of the light-emitting device (see column 6, lines 27-37).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the second area of the n-type layer of the LED in the Song reference in order to increase the light-emitting efficiency of the device. Also, note that if the second area (the area surrounding and under the electrode 38) of the Song reference would have had bumps and dips, the top, or upper level of the bumps and dips is positioned on the p-type contact layer side of the active layer and the bottom level of the plurality of bumps and dips (the lower portion) would be on the n-contact layer side (that is the lower side) of the active layer in the cross-sectional view of the light-emitting diode.

Regarding claim 20, if the first area would include the bumps and dips, then they would have been provided at least between the first area and the n-side electrode as viewed from the electrode-forming plate side, for example in figure 6a of the Song reference.

Regarding claim 21, the p-side electrode has a p-side current diffusing member (the straight portion on top of it), which is provided on the p- type contact layer, for diffusing a current supplied thereto, and a pad member (the trapezoid-shaped section), which is provided at

Art Unit: 2814

least on a pad of the p-side current diffusing member, for supplying a current to the p-side current diffusing member, and

the laminated-layer construction of semiconductor provided in the first area (this is the area beneath region 45 in figure 7), which is positioned between the n-side electrode and the pad member of the p-side electrode, has constricted portions in both sides in a direction perpendicular to a line connecting the n-side electrode and the pad member of the p-side electrode as viewed from the electrode-forming-plane side, as can be seen in the figure, and the plurality of bumps and dips would have been formed in the constricted portions.

Regarding claims 22 and 23, the p-side electrode has a p-side current diffusing member (the straight portion on the top thereof), which is provided on the p-type contact layer, for diffusing a current supplied thereto, and a pad member (the trapezoid-shaped section), which is provided at least on a pad of the p-side current diffusing member, for supplying a current to the p-side current diffusing member, and

the laminated-layer construction of semiconductor provided in the first area (the area beneath region 45 of figure 7), which is positioned between the n-side electrode and the pad member of the p-side electrode, has a portion that is constricted from the n-side electrode along a line connecting the n-side electrode and the pad member of the p-side electrode as viewed from the electrode-forming-plane side, as can be seen in the figure, and the plurality of bumps and dips would have been formed in the constricted portions (in this case the bumps and dips could be formed in the first area). The bottom level of the plurality of bumps and dips would have also been positioned in the n-type contact layer.

Allowable Subject Matter

3. Claim 19 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. The following is a statement of reasons for the indication of allowable subject matter:

The reason for indication of allowability of claim 19 is the inclusion therein of the limitation that of the bumps being in the shape of a trapezoid, and becoming thinner in a direction toward the p-type contact layer side, along with the other limitations in that claim. This limitation is neither disclosed nor thought by the prior art of record, specifically the Kato reference, wherein it only discloses bumps and dips on the active layers, as discussed above.

Response to Arguments

5. Applicant's arguments with respect to the rejected claims have been considered but are moot in view of the new grounds of rejection.

Conclusion

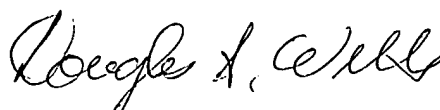
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (571)272-1706. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on (571)272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D. Farahani


DOUGLAS WILLE
PRIMARY EXAMINER